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10/761,338

01/22/2004

Steven E. Hill

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07/28/2006

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EXAMINER

DUPUIS, DEREK L

ART UNIT

PAPER NUMBER

2883

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/761,338

Applicant(s)

HILL, STEVEN E.

Examiner

Derek L. Dupuis

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2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22,24-29,34 and 35 is/are pending in the application.
- 4a) Of the above claim(s) 4 and 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-22,24-29,34 and 35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The declaration filed on 5/1/2006 under 37 CFR 1.131 is sufficient to overcome the Drewery reference.

Response to Arguments

2. Applicant's arguments, see pages 17 and 18, in combination with the amendments to the claims filed 5/1/2006, with respect to the objections to claims 6, 12, 27-29, and 35 have been fully considered and are persuasive. The objections to claims 6, 12, 27-29, and 35 have been withdrawn.
3. Applicant's arguments, see pages 17 and 18, in combination with the amendments to the specification filed 5/1/2006, with respect to the objection to the specification have been fully considered and are persuasive. The objection to the specification has been withdrawn.
4. Applicant's arguments, see pages 17 and 18, in combination with the replacement drawings and the amendment to the specification filed 5/1/2006, with respect to the objection to the drawings have been fully considered and are persuasive. The objection to the drawings has been withdrawn.
5. Applicant's arguments, see pages 17 and 18, in combination with the amendments to the claims filed 5/1/2006, with respect to the rejection of claims 3, 8, 12, and 28 under 35 U.S.C. 112 second paragraph have been fully considered and are persuasive. The rejection of claims 3, 8, 12, and 28 under 35 U.S.C. 112 second paragraph has been withdrawn.
6. The rejection of claims 1-3,6-29,34, and 35 under 35 U.S.C. 103 has been overcome by the declaration file don 5/1/2006 under 37 CFR 1.131. The rejection is therefore withdrawn.

Drawings

7. The drawings were received on 5/1/2006. These drawings are accepted.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-3, 6-9, 17, 19, 20, 34, and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by *Zhao et al (US 2003/0118064 A1)*.
10. Regarding claim 1, Zhao et al teach a photonic device comprising at least one integral waveguide formed from a rare earth doped group IV nanocrystal material (see abstract and paragraphs 2, 5, 7, 9, and 12)). The rare earth material used by Zhao et al is erbium and the group IV nanocrystal material is silicon.
11. Regarding claim 2, Zhao et al teach a photonic device as discussed above in reference to claim 1. As shown in figure 3, the waveguide has a planar structure.
12. Regarding claim 3, Zhao et al teach a photonic device as discussed above in reference to claim 2. As shown in figure 3, the device comprises a substrate (102), a layer containing the REDGIVN material (104), and a lateral containment element (the ridge) to laterally confine light to a region within the layer containing the REDGIVN material where the at least one waveguide is defined (see paragraphs 49 and 50).

13. Regarding claim 6, Zhao et al teach a photonic device as discussed above in reference to claim 1. Zhao et al teach that a pump source (YAG laser) is adapted to activate the nanocrystals in the waveguide which in turn activate the rare earth element in the REDGIVN (see paragraph 54).
14. Regarding claim 7, Zhao et al teach a photonic device as discussed above in reference to claim 6. As shown in figure 8, light signals can be inputted to the waveguide and amplified output signals can be outputted (see paragraphs 70 and 71).
15. Regarding claim 8, Zhao et al teach a photonic device as discussed above in reference to claim 7. As shown in figure 3, the device comprises a substrate (102), a layer containing the REDGIVN material (104), and a lateral containment element (the ridge) to laterally confine light to a region within the layer containing the REDGIVN material where the at least one waveguide is defined (see paragraphs 49 and 50).
16. Regarding claim 9, Zhao et al teach a photonic device as discussed above in reference to claim 7. The pump source is an optical YAG laser (see figure 3).
17. Regarding claim 17, Zhao et al teach a photonic device as discussed above in reference to claim 1. Zhao et al teaches that light is received into a surface of the waveguide (see figure 8).
18. Regarding claim 19, Zhao et al teach a photonic device as discussed above in reference to claim 1. As shown in figures 3 and 8, the device has an output surface to output a signal to another optical element.
19. Claim 20 is a **product-by-process claims**:

Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Thorpe*, 227 USPQ 964, 966; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the

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patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 2113.

20. Claim 20 does not distinguish over the Zhao et al reference regardless of the process used to form the waveguide, because only the final product is relevant, and not the process of making such as forming the waveguide in an opening in a resist prior to the resist being removed.
21. Regarding claim 34, Zhao et al teach a photonic device as discussed above in reference to claim 1. Zhao et al teach that the silicon nanocrystal structures are doped with rare earth elements (see paragraph 9).
22. Regarding claim 35, Zhao et al teach a photonic device as discussed above in reference to claim 34. Zhao et al teach that the concentration of erbium is between 0.5 and 15 percent. Specifically, Zhao teaches a concentration of 1% (see paragraph 52).
23. Claims 3, 6, 7, 8, 12, and 25 include the limitation that items are "adapted to" perform specific functions. It has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchinson, 69 USPQ 138.

Claim Rejections - 35 USC § 103

24. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

25. Claims 10-16, 18, 21, 22, and 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Zhao et al (US 2003/0118064 A1)* as applied to claims 1-3, 6-9, 17, 19, 20, 34, and 35 above, and further in view of *Tsunekane et al (US 2002/0126724 A1)*.

26. Regarding claims 10-16, 18, 21, 22, and 24, Zhao et al teach a device as discussed above in reference to claim 9. As shown in figure 3, the device comprises a substrate (102), a layer containing the REDGIVN material (104), and a lateral containment element (the ridge) to laterally confine light to a region within the layer containing the REDGIVN material where the at least one waveguide is defined (see paragraphs 49 and 50). Zhao et al also teach that the waveguide could comprise a plurality of waveguides (see paragraph 67).

27. Zhao et al do not teach that the optical pump source comprises a plurality of LEDs that transversely pump the waveguide layer. Zhao et al also do not teach that coupling optics are used between the LEDs and the waveguides to focus light from the LEDs into the waveguide.

28. Tsunekane et al teach an LED pumped optical waveguide device as shown in figure 5. A plurality of broadband LEDs (20) are used to transversely pump light into the waveguide (10). Coupling optics (30) are placed between each LED and the waveguide so as to focus light from each LED into the waveguide. A reflection chamber (80 and 81) surrounds the device to contain light. The output light is coupled to another optical element (70) through free space optics as can be seen in figure 5. As shown in figure 6, an optical taper is used to transmit light from the LEDs into the optical medium using TIR. Tsunekane et al also teach that prisms (72) can be used to direct light to various locations. Zhao also teaches that the pump source activates the nanocrystals which in turn activate the erbium (see paragraph 54). Tsunekane et al also teach

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that an HOE is located downstream from the LEDs. Examples of HOEs are elements 72, 73, and 74.

29. It would have been obvious to one of ordinary skill in the art at the time of invention to combine the inventions of Zhao et al and Tsunekane et al by using the REDGIVN material in amplification medium taught by Zhao et al in the optical medium of Tsunekane et al. Motivation to combine these references is that the REDGIVN material increases the photoluminescence of a medium (see paragraph 9 of Zhao) and that the pumping structure taught by Tsunekane et al also allows for good quality control of amplification.

30. Regarding claims 25-29, Zhao et al teach a photonic device with an amplification medium comprising a REDGIVN material (see abstract). Zhao et al do not teach that the optical pump source comprises a plurality of LEDs. Zhao et al also do not teach that a combiner is used between the LEDs and the waveguides to focus light from the LEDs into the waveguide.

31. Tsunekane et al teach that a plurality of LEDs (2) can be combined to form a broadband optical pump source to pump light into an amplification medium (1) as shown in figure 3.

Tsunekane et al teaches that the combining element can be a focusing element such as a lens or microreflector as is used in other embodiments (see paragraph 65-72) and that the detector (7) detects the fluorescence of the optical medium. The LEDs are aligned with the input lens and with the optical medium as can be seen in figure 3. As can be seen in figure the 5, the lens being used to focus the light sources is a plano-convex aspherical lens. The lens has a F# because every lens has a focal length and a diameter.

32. It would have been obvious to one of ordinary skill in the art at the time of invention to combine the inventions of Zhao et al and Tsunekane et al by using the REDGIVN material in

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amplification medium taught by Zhao et al in the optical medium of Tsunekane et al. Motivation to combine these references is that the REDGIVN material increases the photoluminescence of a medium (see paragraph 9 of Zhao) and that the pumping structure taught by Tsunekane et al also allows for good quality control of amplification.

Conclusion

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. *JP 09-295891 (Rikagaku Kenkyusho)* teaches a photonic device that includes limitations present in at least claim 1.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek L. Dupuis whose telephone number is (571) 272-3101.

The examiner can normally be reached on Monday - Friday 8:30am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

7/20/06

KAVEH KIANNI
PRIMARY EXAMINER

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